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Productivity Perspectives

1987 Edition



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Productivity Perspectives

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Introduction

The great productivity recovery of 1983-84 turned out to be shorter lived than even the habitual pessimists expected. Labor productivity in the business economy increased only 1.0 percent in 1985, and without an exceptional performance in farming, that figure would have been only 0.5 percent. Total factor productivity improvement was slightly worse. The shape of the productivity curve is reminiscent of the late 1970s: several years of stagnation followed the steep recovery of 1975-77.

The usual contributors to productivity improvement such as low inflation, improving R&D levels, few work stoppages, and favorable demographics (more experienced workforce) should have prevailed. But the U.S. is still saddled with an unprecedented federal budget deficit affecting interest rates and capital availability. The U.S. service industries have generally failed to respond to the clear need for productivity improvement with the vigor that is becoming typical in manufacturing industries. These service

industries, a large part of the cost structure of manufacturing industries, are part of the front line of the international competitive struggle also, but many of them have not yet realized it.

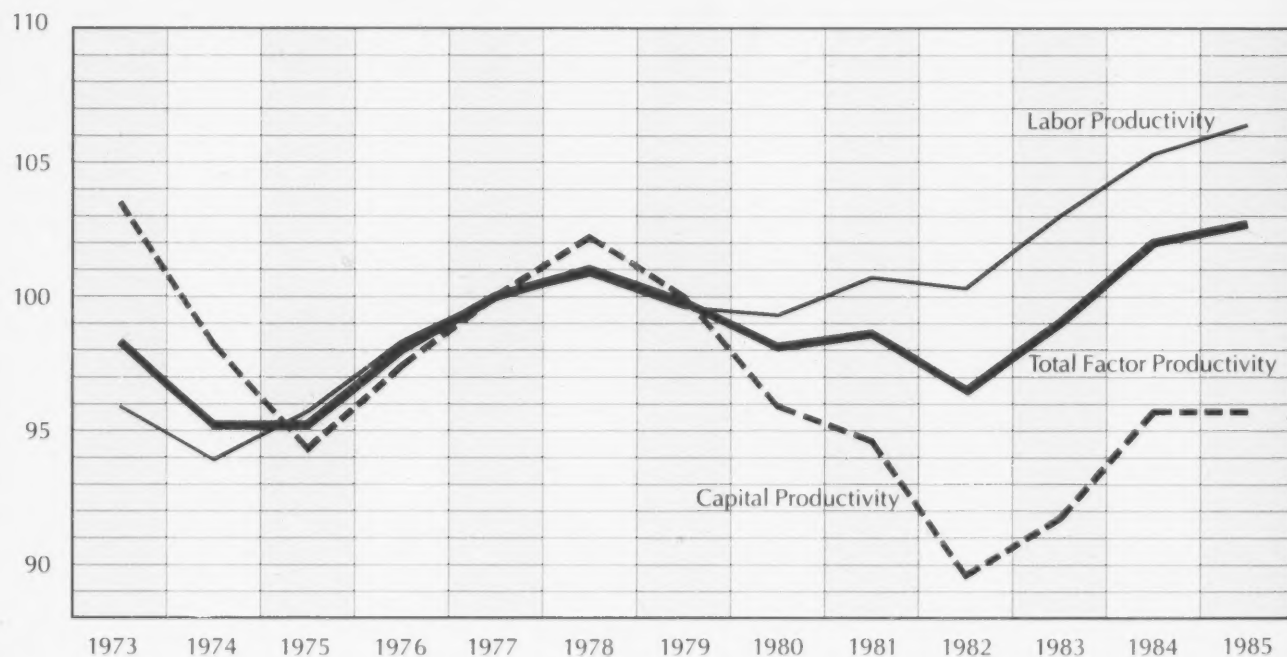
II. U.S. Productivity in the 80s

Interpretation of the productivity trend of the last decade depends very much on where one starts and finishes. After a reasonable increase in productivity from the bottom of the first OPEC scare (1974) and continuing through 1978, it could have been inferred that the United States was on the verge of the good old days in productivity improvement. A period of relative stagnation followed, from 1978 through the early 80s, with another recovery in 1983 and 1984. It now appears that the U.S. is into another leveling out phase, with 1985 showing negligible progress and the statistics to date in 1986 being little better.

Most published statistics deal with labor productivity, which, as is clear from **Figure 1**, is a more optimistic story than total factor productivity, which reflects the trends in capital input as well as labor input. Capital productivity is harder to interpret than labor productivity, because increases in capital input that are unaccompanied by output increases may or may not be "bad." Long-term investments are sometimes made in which the capital commitment precedes the output "harvest" by months or even years. Nevertheless, there are periods of economic stagnation where an economy is

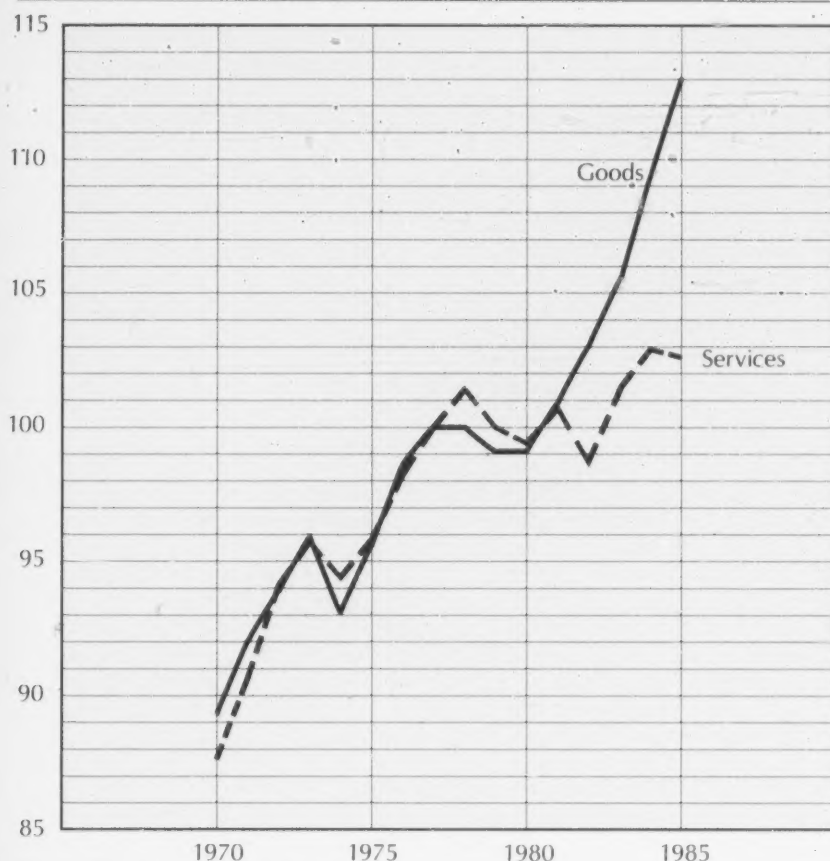
clearly overinvested in capital stock. There is little doubt that the valley in capital productivity in the early 80s was more the latter than the former. The level of research and development expenditures, which could have been a harbinger of capital pre-investment, was in fact very low also. So it is fair to say that the recession of the early 80s caught us with simply too much capital, both fixed and inventory. We are now seeing cyclical recovery in capital productivity, but it would be premature at this point to say that any apparent systematic improvement is being made in utilization of capital.

Figure 1
Productivity Trends in U.S. Private Businesses, 1973-85



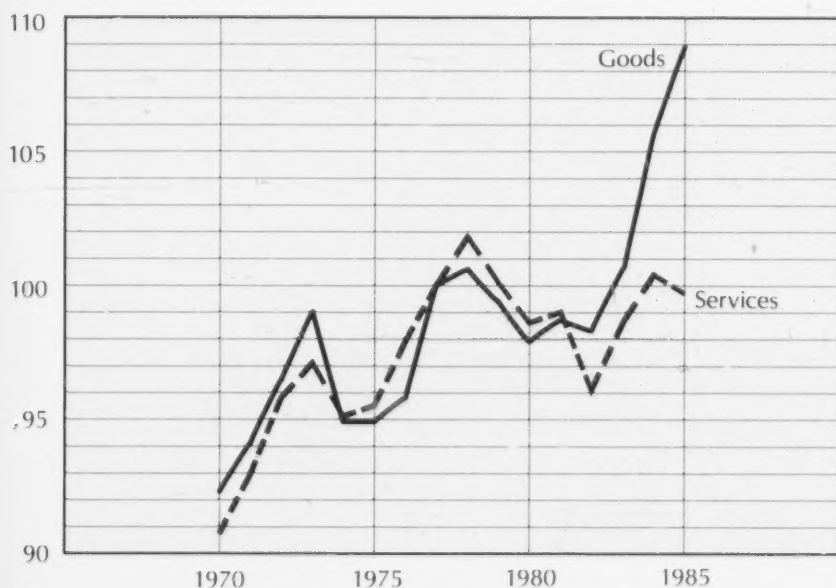
Source: American Productivity Center

Figure 2
2a. Labor Productivity, 1970-85



Source: American Productivity Center

2b. Total Factor Productivity, 1970-85



Source: American Productivity Center

Figure 2 reports both labor productivity and total factor productivity for the goods and services segments of the economy. Goods includes farming, manufacturing, construction, and mining. Services includes everything else in the private economy, the major components being retail and wholesale trade, public utilities, communications; and transport. It is clear that from any starting point after 1977, the service industries have performed very poorly compared to the goods industries. In fact, the total productivity level of the service industry in 1985 is below that of 1977! There are strong performers and weak performers in both goods and services, but as the inset table reveals, the productivity performance of the last decade has been below expectations.

**1977-1985
Percent/Year**

	Labor Productivity	Total Factor Productivity
Goods	1.5	1.1
Services	0.3	0.0

There was essentially no progress for nearly a decade in the service industries, while there was some progress in goods. The progress in goods will later be shown to be relatively little compared to international competition, but at least it is progress.

Figures 3 through 5 present in detail the productivity performance of the major parts of the economy, both over the period 1979-85 and for the year 1985. The data are presented for both labor productivity and total factor productivity. **Figure 3** looks at the major segments of the economy. Over the longer term period, aside from farming—

which is statistically a rather special case—the leading performer in labor productivity is still the communications industry, which is the long-term champion since 1948. Railroads have also done very well, even though this progress is an effective downsizing, rather than growth. Notable weaknesses, in terms of their effect on the whole economy,

are the finance and insurance industries, non-rail transportation, and construction. Each of these segments has its own story as to why productivity growth has been less than expected in any particular year.

The banking industry is in the middle of a fierce competitive struggle with “non-banks” and, in order to compete, has chosen this time to make substantial changes in both operating procedure and strategy. There are some well-publicized uncontrollables in regard to loans, but productivity deals essentially with operating efficiency, and here such prolonged poor performance is hard to explain. The insurance industry is faced with a crisis in the area of excessive liability claims, but again there is an underlying efficiency issue also. Non-rail transports have been abruptly deregulated. This deregulation was alleged to be a productivity improver in the long run and may still be, but in the short run there have been unexpected disruptions in the flow of operations in spite of relatively high load factors in some forms of transportation. The construction industry depends heavily on the economy as a whole, and since the economy has not been performing well lately, neither has construction. But the construction industry is also the main field where issues of job classifications are being argued, and there is no doubt that there are some productivity improvements possible from rationalization of labor restrictions.

Figures 4 and 5 show the best and worst performers in twenty manufacturing industries, which collectively cover all of manufacturing. The leading performer in both the longer term period and in 1985 is non-electric machinery. This is due to a 1984 and 1985 spurt in volume unaccompanied by an increase

Figure 3

Productivity Performance by Segment

	1979-85		1985	
	Labor Pty.	Total Factor Pty.	Labor Pty.	Total Factor Pty.
Business Economy	1.1	0.5	1.0	0.7
Farming	7.0	5.6	21.7	17.4
Communication	3.9	1.3	1.4	(1.8)
Railroads	3.5	1.4	4.0	3.0
Manufacturing	3.1	2.1	4.4	3.7
Utilities	1.8	1.7	3.1	2.4
Trade	1.3	0.8	1.7	1.0
Miscellaneous Services	0.7	0.8	(0.8)	(1.0)
Mining	(0.2)	(1.5)	(1.2)	(2.1)
Finance & Insurance	(1.3)	(2.0)	(8.0)	(8.1)
Real Estate	(1.4)	(3.2)	1.3	0.5
Non-Rail Transportation	(1.8)	(2.0)	(3.1)	(2.6)
Construction	(2.2)	(2.0)	(4.5)	(3.8)

Source: American Productivity Center

Figure 4

Best/Worst Labor Productivity Performance, Manufacturing Industries

1979-85				
Best		Worst		
Non-Elec. Machinery	10.6	Tobacco		(4.7)
Rubber	4.2	Printing		(0.7)
Food	3.7	Instruments		0.4
Textiles	3.5	Leather		0.4
Chemical	3.2	Furniture		0.6
Elec. Machinery	3.2			
1985				
Best		Worst		
Non-Elec. Machinery	25.3	Tobacco		(16.2)
Petroleum	8.5	Furniture		(5.3)
Primary Metal	6.6	Leather		(4.7)
Elec. Machinery	6.1	Transp. Equipment		(2.4)
Rubber	5.2	Apparel		(1.9)

Source: American Productivity Center

in labor. Although it is assumed much of this is cyclical effect, perhaps there is some new competitiveness in this industry, which has been pushed for many years by foreign competitors. The rubber industry has also turned in a notable performance over the recent period. Food and textiles have been doing well for some time, food because steadily increasing demand takes it out of cyclical fluctuation. The textile industry has been very successfully downsizing through automation.

The worst performances over this period were turned in by tobacco and petroleum, both examples of less successful downsizing. Whereas tobacco's performance is poor in both labor and capital productivity, petroleum industry performance problems are limited to capital productivity.

There is immense overcapacity in the industry, and it will take some time to work this out.

There are similar problems in the primary metal industry and in printing.

Figure 5
Best/Worst Total Factor Productivity Performance, Manufacturing Industries

1979-85			
Best		Worst	
Non-Elec. Machinery	9.1	Tobacco	(8.0)
Rubber	4.0	Petroleum	(4.0)
Food	2.9	Primary Metal	(0.9)
Textile	2.6	Printing	(0.9)
Chemicals	2.0	Leather	(0.6)

1985			
Best		Worst	
Non-Elec. Machinery	23.8	Tobacco	(19.8)
Primary Metal	5.5	Leather	(5.8)
Rubber	4.5	Furniture	(5.2)
Elec. Machinery	4.1	Apparel	(2.3)
Paper	3.0	Transp. Equip.	(1.9)

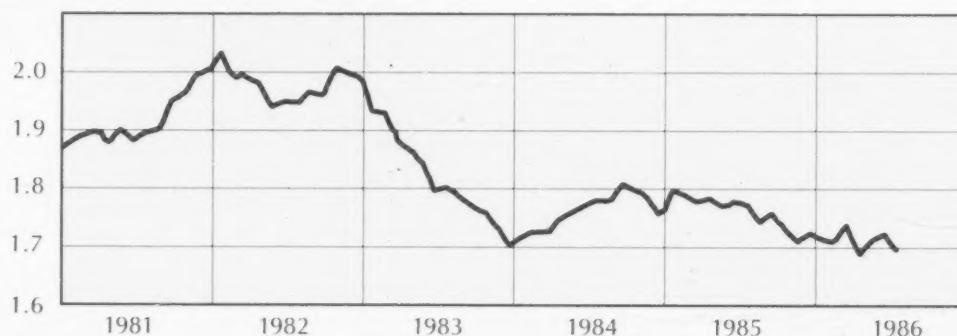
Source: American Productivity Center

In capital productivity, utilization of plant and equipment is a main driver. But it is also interesting to monitor manufacturing inventories because this is a popular area for productivity improvement. The inventory-to-sales ratio is, in effect, a capital productivity ratio. **Figure 6** shows the recent history of the real inventory-to-sales ratio in the manufacturing sector. There was substantial, purely cyclical

improvement in 1983, but expected further improvement has failed to materialize. One of the major discussion points at gatherings of manufacturers is how much work-in-process inventory reduction has been accomplished through just-in-time techniques. There are plenty of individual plant examples and one would assume that there are many practitioners of these new techniques, but the

expected dramatic improvement in manufacturing inventories does not show up in the statistics. Even if it is interpreted that the last two years' improvement, about a six percent reduction, is a real improvement rather than cyclical, that still is a lot less improvement than would be expected from all the magazine articles on the subject.

Figure 6
Real Inventory-to-Sales Ratio in Manufacturing



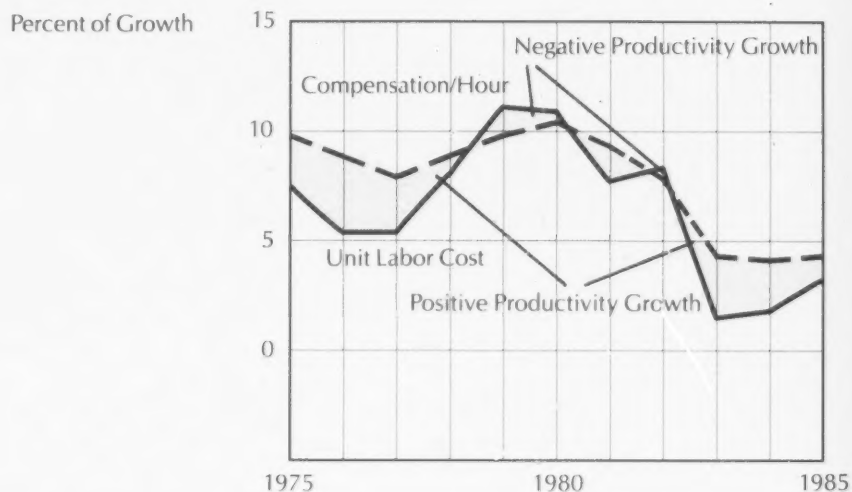
Source: Goldman Sachs

Figure 7 shows the "bottom line" of productivity from both a businessman's and a worker's point of view. For the businessman, productivity serves as a dampener of increases in unit labor cost. Unit labor cost increases have fluctuated a great deal in the last ten years, from a high of over 10 percent per year in 1979 and 1980, to below 2 percent in 1983 and 1984. Unfortunately there was an upturn in unit labor cost in 1985. Since compensation per hour increased only 4.3 percent in 1985, a very low unit labor cost number might be expected, but the productivity component of the calculation completely failed. As a result, unit labor costs shot ahead over 3 percent. If the productivity improvement rates of 1983 and 1984 had been sustained, the unit labor cost increase would still be modest.

From the worker's point of view, the increase in real compensation per hour was at least an increase in 1985, 0.7 percent. This is certainly better than the negative standard of living periods in 1979, 1980, and 1981 and the brief dip into negative ground in 1984. If growth in real compensation per hour is thought of as growth in standard of living, it may be that the well-publicized risk of our being the first generation in recent history to leave our children a lower standard of living has receded; but plugging along at just slightly over zero is not exactly a dramatic response to that challenge.

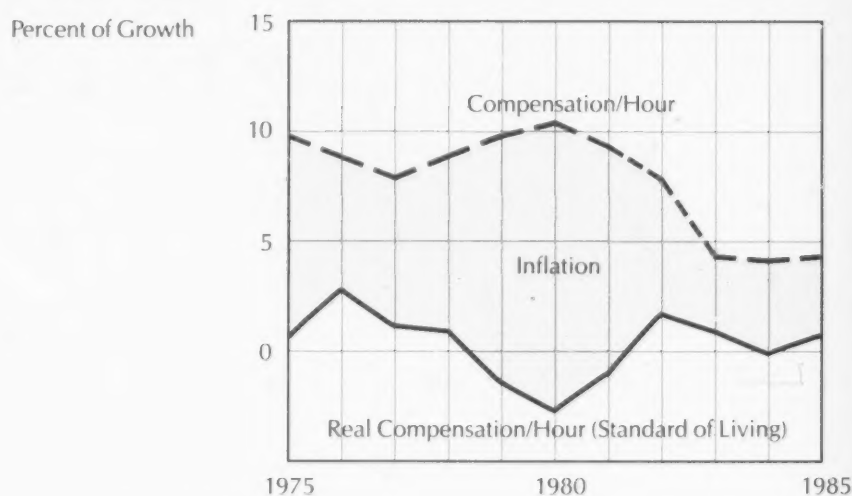
Figure 7
Productivity and Standard of Living

7a. Business View



Source: Bureau of Labor Statistics

7b. Worker View



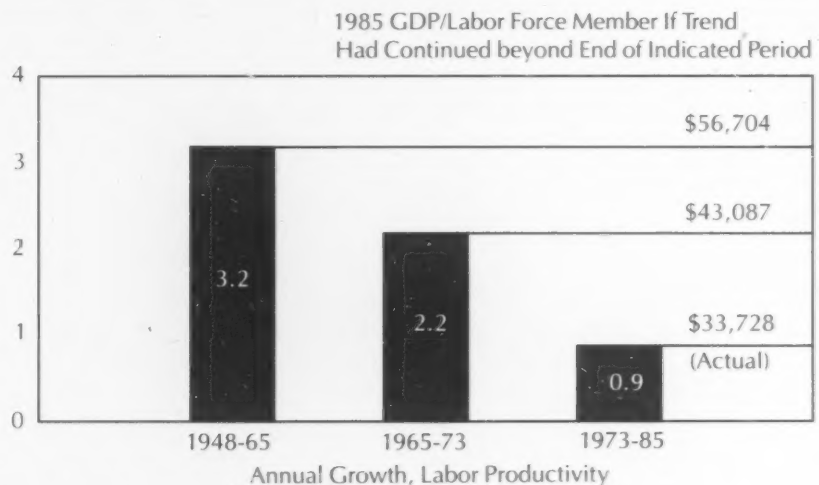
Source: Bureau of Labor Statistics

Another way of looking at standard of living is presented in **Figure 8**. If standard of living is more generally thought of as gross domestic product per member of the labor force, this figure demonstrates the shortfall in standard of living that is attributable to our failure to sustain historical productivity improvement rates. Labor productivity improvement in the period 1948-65 averaged 3.2 percent per year. From a long-term historical perspective, perhaps that was an unsustainably high rate and it is unfair to extrapolate it; but if it had continued from 1965 through 1985 and everything else were left constant, the gross domestic product per labor force member would now be over \$56,000. If the 1965-73 rate of 2.2 percent had been continued—perhaps a more realistic expectation—we would

all now have a slice of GDP equal to \$43,000. Instead we experienced only a 0.9 percent growth in labor productivity in 1973-85, and our current GDP is only a little over \$33,000. Thus, it could

be said that every member of the labor force has left \$10,000 or maybe even more than \$20,000 on the table through insufficient attention to productivity improvement.

Figure 8
Labor Productivity and Standard of Living Shortfall



II. Interpretation of U.S. Performance

The most direct effect on capital productivity comes from the rate at which fixed equipment and plant is utilized. This is measured by the capacity utilization index of the Federal Reserve Board, which is presented in **Figure 9**. In the last year there has been a brief increase and then an offsetting slight decline in the utilization rate. The United States is still producing slightly below 80 percent, where in recent history the range has been 70 to 85 percent. Thus, the U.S. is now about two-thirds of the way up the range of capacity utilization. There is more capacity available in some places, but not a general overabundance. Unfortunately, there is some evidence that some of the idle capacity is in the wrong place. Perhaps this is inevitable, but an industry-by-industry measuring of capacity utilization would have more interpretive value.

Figure 9
Capacity Utilization, 1978-86

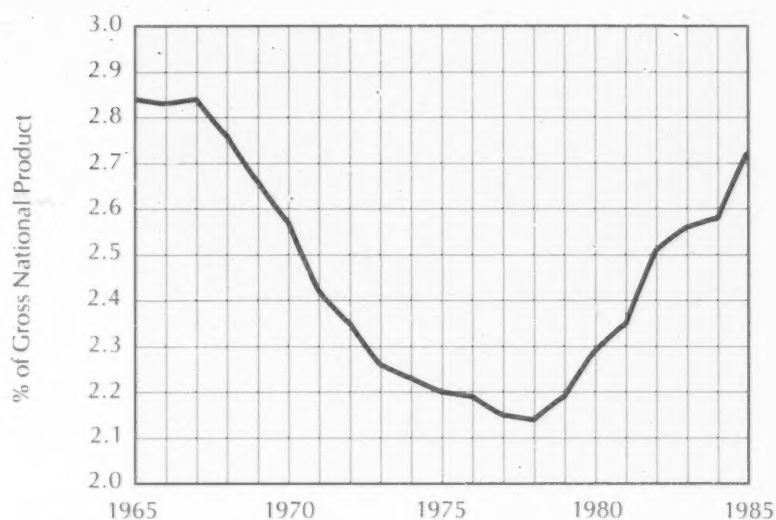


Source: Federal Reserve Board

Another clear impact on productivity comes from research and development, although the impact is usually a lagged one. In the late 1970s the United States reached an historically very low level of R&D as a percent of gross national product, as shown in **Figure 10**. R&D as a percent of gross national product had typically been between 2-1/2 and 3 percent, but fell below 2.2 percent. This may sound like a small difference, but one-tenth of a percent of GNP is a great deal of money. In 1985 R&D reached over 2.7 percent—which is a very substantial and rapid improvement from the level of the late 70s—and there is reason to think the number could go higher.

It is sometimes quibbled that the makeup of this research and development is not as salutary as R&D in other countries because such a high proportion of it is in military-directed research rather than civilian research. Others will argue that the line between military and civilian research is a rather flexible one, and we can certainly point to substantial breakthroughs of civilian value that have come from defense programs. This chart interpreted alone would suggest support for an optimistic argument for productivity in the late 80s, but this of course assumes that the research now being done is as effective as it has been historically, and that recent initiatives by the U.S. government to enable competitors or near competitors to cooperate on some issues may enhance the effectiveness of each dollar of research.

Figure 10
U.S. Research & Development, 1965-85



Source: National Science Foundation

No review of the current economy is complete without recognizing the substantial effect on productivity performance that comes from the budget deficit, interest rates, and related macroeconomic effects.

Figure 11 shows just how large recent borrowing has been within the American economy, both by the private sector and by the federal government. Private sector borrowing, which once used to peak at about 14 percent of GNP at the top of a recovery, reached 23 percent of GNP in the fourth quarter of 1985 and is still at what used to be thought of as peak levels. The level of federal borrowing, which used to be thought of in twos and threes, has now reached 7 percent of GNP, after having been 8 briefly. Together this gives a borrowing level of a staggering 31 percent of GNP in the fourth quarter of 1985, or twice the historical peaks. Of course, some of the borrowing is to finance the federal deficit; but some of the private borrowing is to finance leveraged buyouts and the like, which at best are hard to connect with productivity improvement. To the extent that financing of sophisticated shifts in ownership replaces financing of productivity improvement, the country is all the poorer for it. It is sometimes possible for new ownership to stimulate productivity improvement, but there are many examples of new owners throwing out all the "unnecessary" long-term productivity and quality improvement processes because no one can prove their immediate effect on the bottom line and that is what is necessary in order to keep one step ahead of the investment banker.

Figure 11
Financing Economic Output
(Borrowing as Percent of GNP)

	Private	+	Federal	=	Total
1973-I (recovery peak)	14%		2%		16%
1975-I (recession valley)	7		3		10
1977-IV (recovery peak)	14		3		17
1982-I (recession valley)	7		4		11
1985-IV (recovery in progress)	23		8		31
1986-II (latest)	12		7		19

Source: Goldman Sachs

Figure 12
Specific Inflation
(Percent Increase)

	1980	1981	1982	1983	1984	1985
CPI, total	12.4	8.9	3.9	3.8	4.0	3.7
Commodities						
Food	10.3	4.3	3.2	2.6	3.8	2.6
Energy	19.0	10.6	(5.0)	(5.7)	(1.9)	3.4
All Other	9.9	5.9	5.7	5.0	3.1	2.2
Services						
Energy	16.0	14.5	14.0	4.0	3.4	(0.4)
All Other	14.1	12.9	3.4	4.9	5.6	5.7

Source: Goldman Sachs

The largest economic story of the last decade has been the great increase and then reduction of inflation in the U.S. Double-digit inflation of five years ago has been replaced by a very low rate of inflation in the recent past.

Figure 12 demonstrates some of the different inflation rates.

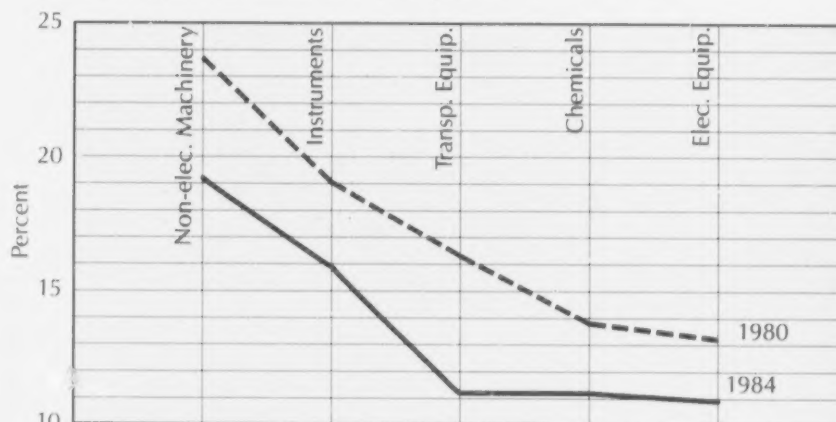
There is no one single inflation rate. For productivity purposes it is best to think of inflation as the price of a particular set of goods or services. Each type of good or service has its own price and its own price movements. So although inflation has in general been reduced, not all categories

have been equally reduced. From the consumer's point of view, the overall inflation of the last four years has been around 4 percent a year. This is made up of an energy inflation rate that is negative for fuels but distinctly positive for energy services, such as those provided by utilities. All other services have had an inflation rate over 5 percent rather than below 4 percent. As these general categories are further broken down, there are still some segments of the economy where inflation is in the high single digit range.

The biggest effect of all on productivity comes from the progress or lack of progress in international trade, particularly for the manufacturing sector but also for the service industries that supply the manufacturing industries. Although trade will be thoroughly discussed in the section on international trends, the relative impact of foreign goods in the United States and the relative importance of export to some industries is highlighted in **Figure 13**. The 1984 statistics show that there are some industries, such as non-electric machinery and instruments, where exports, at 15 to 20 percent of total shipments, is a key determinant of success or failure. But all of the major export industries shown used to export a higher percentage of their product than they do now. From 1980 to 1984 virtually all export industries have had increased difficulties exporting, largely because of the strong dollar. Conversely, on the import side, industries that were already highly affected by imports in 1980 are almost without exception even more affected now. The most dramatic example is in leather imports: in four short years, they have gone from a 27 percent share of the U.S. market to an almost 45 percent share.

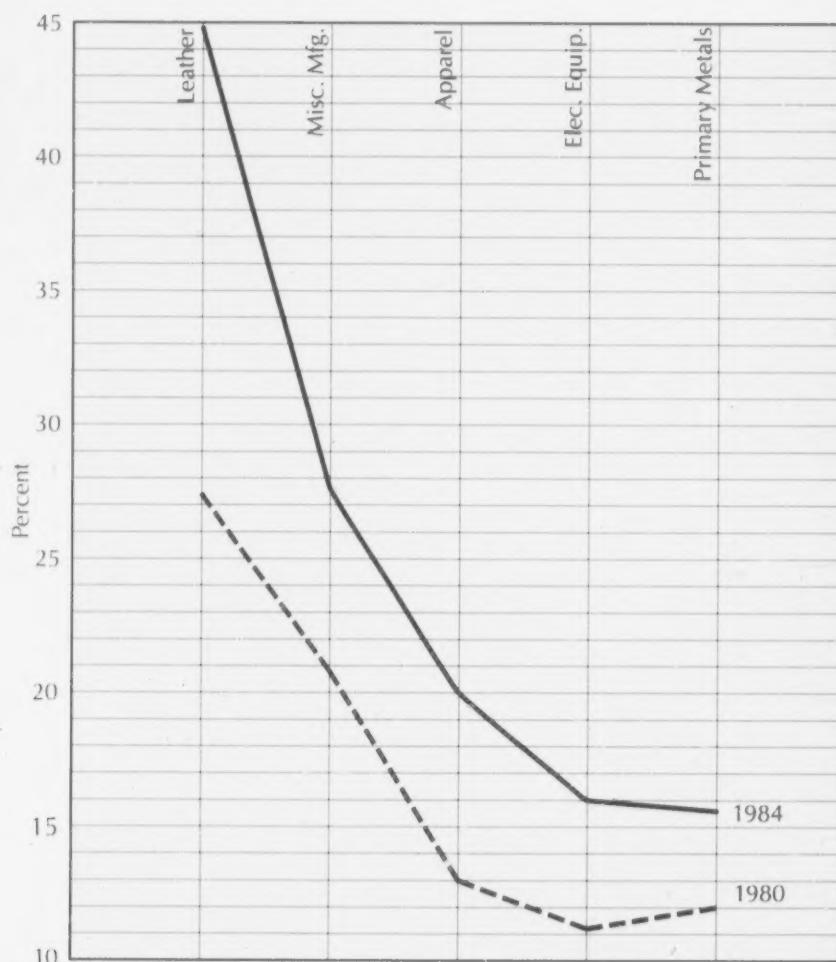
Figure 13
Manufacturing in Industrial Trade (by Two-Digit Group)

13a. U.S. Exports as Percent of U.S. Shipments



Source: U.S. Department of Commerce

13b. U.S. Imports as Percent of U.S. Use



Source: U.S. Department of Commerce

Another key issue in regard to productivity improvement in the United States is the need to recognize that productivity statistics are affected by both production workers and non-production (mainly white collar) workers. Productivity has long been thought of as improving the efficiency of the production plant or perhaps the "back room" operations in banks or insurance companies. But the way productivity is calculated here, all economic activity is subject to productivity improvement. Thus, when volume decreases, it is not just the "direct" labor that needs to be analyzed. Industries whose volume is permanently declining need to recognize that there is a need to reduce permanently the whole workforce, not just the direct labor.

Figure 14 shows production workers as a percent of industry employment in several industries. This is a close cousin to the famous direct-indirect ratio that many people use to manage their business. There is obviously no "ideal" direct-indirect ratio, because it is very much a function of what industry you are in. This table shows eight industries with a high percentage of production workers and eight industries with a relatively low percentage of production workers. Note that in both categories, the trend over the last ten years has been to a lower percentage of production workers.

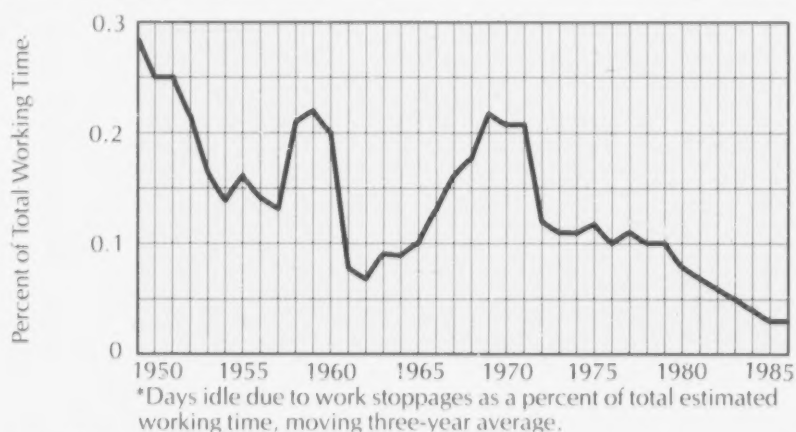
Regardless of the success or failure of the industry, there is an increasing percentage of the workforce that is indirect and, by inference, white collar. In the short term, a decline in business volume that is thought to be temporary might be accompanied by reduction in direct labor force, but not by reduction in indirect labor. But over a period as long as ten years, it would be

Figure 14
"Production" Workers As Percent of Industry Employment

	1974	1984	Change Direction
Textiles	87.2	86.6	-
Furniture	85.3	85.8	+
Apparel	87.1	85.2	-
Motor Vehicle	81.9	82.8	+
Canned Food	86.5	82.7	-
Cement	80.3	79.2	-
Steel Mills	79.4	76.6	-
Tobacco	86.7	75.8	-
Electrical Instruments	60.0	53.4	-
Photo Equipment	57.0	53.3	-
Semiconductors	61.3	49.2	-
Aerospace Vehicles	55.0	49.2	-
Drugs	51.2	48.8	-
Computers	49.0	41.5	-
Soft Drinks	35.7	37.4	+
Newspapers	46.6	37.3	-

Source: Department of Commerce

Figure 15
Work Stoppages*, 1949-85



Source: Bureau of Labor Statistics

expected that hiring in most categories of indirect labor would also be controlled. It is very likely that one of the weaknesses of the United States as compared to other countries is its reluctance to keep the size of its corporate and divisional staffs under control. And **Figure 14** demonstrates that virtually all industries are becoming increasingly indirect in their makeup. Although indirect workers do vitally important work, not all indirect workers do vitally important work.

Figure 15 shows the continuing decline in the frequency and severity of work stoppages. Although a surge in work stoppages would have a substantial effect on productivity, there is no way that work stoppages can be blamed for the poor productivity performance of the last 15 years. In fact, the level of work stoppages as a percent of working time has fallen in that 15 years by a factor of more than five times.

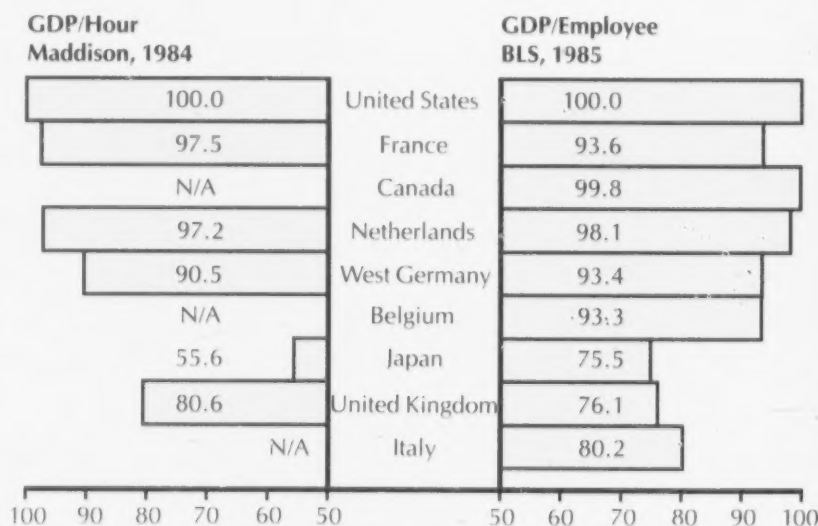
III. International Productivity

The United States is still the world leader in level of labor productivity among major industrial nations. As shown in **Figure 16**, the United States leads in both gross domestic product per employee and gross domestic product per hour. In the GDP per employee calculation, Canada and the Netherlands are very close to the United States, and France, West Germany, and Belgium all fall between 93 and 94 percent of the level of the United States. Japan is at a 75 percent level. In GDP per hour the numbers are a little different. France and the Netherlands are the closest competitors, and Japan is quite a bit further down—in this case 55.6 percent. The major difference between the two statistics is the number of hours worked per employee. Since the Japanese work substantially longer hours than workers in other major countries of the world, Japan does relatively better on per employee calculations than per hour calculations. In France, since the French work shorter hours than the United States, the tendency is the opposite.

Comparing productivity levels of different countries is always difficult because comparisons require a translation from one currency to another. The published basic exchange rates are not a good basis for translation of currency values because they fluctuate widely. Money is a commodity just like soybeans, and the current supply and demand for the "product" is subject to many short-term pressures

in addition to relative basic wealth. Thus, a purchasing-power-parity basis has been developed where "theoretical" exchange rates are calculated based on a market basket of goods and services used around the world. Although it is a much steadier and more fundamentally sound basis, for any given country it could be somewhat distorting.

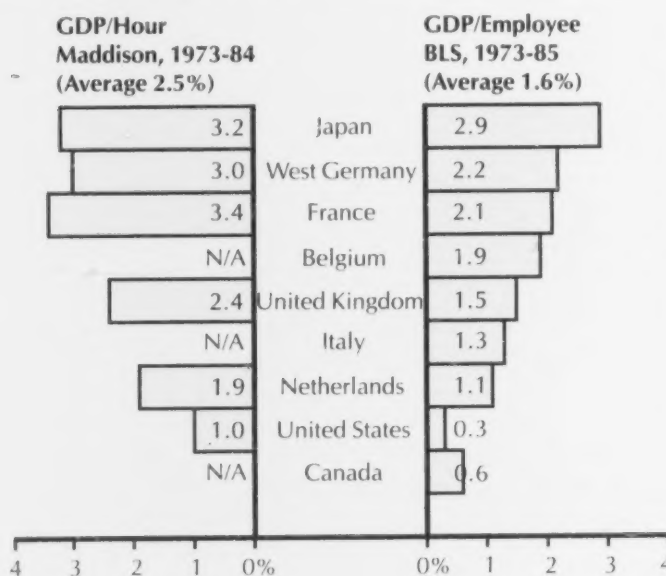
Figure 16
International Productivity Levels



Source: Angus Maddison, Bureau of Labor Statistics (Purchasing-Power-Parity Basis)

The international productivity growth statistics are shown in **Figure 17**. Japan continues to lead the other major industrial countries of the world in productivity growth whether it is measured in GDP per employee or GDP per hour. The only minor exception is that in the GDP per hour calculation, France has slipped slightly ahead of Japan for the 1973 to 1984 period. The United States for this period remains last in either calculation. Although it is statistically easier to deal with only the "major industrial" countries of the world, competition comes from other countries also. **Figure 18** shows some productivity growth comparisons between the United States and Russia. The Russian statistics are calculated by the Central Intelligence Agency and should be considered more an approximation than an exact calculation. It is an interesting coincidence that the average productivity improvement rate for the period 1960 to 1985 appears to be equal: 1.9 percent for both the United States and the Soviet Union. Even the time patterns are fairly similar, with both countries doing relatively better in the early part of this time period and stagnating in the recent past. The major difference appears in the total factor calculation. Here Russia clearly has shown difficulty in the utilization of capital. If evidence is needed, this proves that the Russians are not very effective "capitalists."

Figure 17
International Productivity Growth



Source: Angus Maddison, Bureau of Labor Statistics

Figure 18
U.S. and U.S.S.R. Compared

	Labor Productivity Growth		Total Factor Productivity Growth	
	U.S.	U.S.S.R.	U.S.	U.S.S.R.
1960-65	3.9	3.1	3.4	(0.1)
1965-70	1.8	2.9	1.1	0.6
1970-75	1.6	1.3	0.7	(1.4)
1975-80	0.7	1.1	0.6	(1.4)
1980-85	1.4	1.3	0.9	(1.2)
Average 1960-85	1.9	1.9	1.3	(0.7)

Source: American Productivity Center (U.S.), Central Intelligence Agency (U.S.S.R.)

The American Productivity Center and the Japanese Productivity Center have cooperated to provide more in-depth information on the United States and Japanese economies. (See **Figures 19a, b, c, and d.**) The respective economies are divided into goods and services and manufacturing further divided into industries. The original calculations made over the

period 1970 to 1980 are shown, with a more recent revision showing 1980 to 1983. In general, it can be stated that U.S. relative performance has improved substantially in the later period. In the earlier period, Japan was growing faster than the United States in almost every category. Now the situation is much more mixed.

These charts give further evidence of the obvious assertion that in business sectors the Japanese have chosen to emphasize as a country, they have succeeded in reaching productivity growth rates and levels higher than those of the United States. But in the parts of their economy they have "neglected," mainly services pertaining to the domestic economy only, the United

Figure 19
U.S. and Japan Compared

19a. Labor Productivity Growth, Economy

	1970-80		1980-83	
	U.S.	Japan	U.S.	Japan
Private Business Economy	1.2	5.4	1.6	3.0
Goods	1.5	6.8	2.2	5.0
Agriculture	1.4	5.7	(1.0)	1.4
Mining	(3.8)	7.8	(0.1)	6.2
Construction	(2.7)	0.6	0.9	(1.4)
Manufacturing	2.5	7.7	3.1	6.2
Services	0.9	3.8	1.2	1.0
Transportation & Communication	3.2	3.7	2.7	0.4
Utilities	1.2	2.3	(0.2)	6.7
Trade	1.6	5.1	2.8	0.5
Finance & Insurance	0.2	6.0	(0.2)	7.1
Real Estate	(0.5)	1.0	(2.7)	(3.2)
Business & Professional	(1.0)	0.7	1.2	(1.3)

Source: American Productivity Center

19b. Total Factor Productivity Growth, Economy

	1970-80		1980-83	
	U.S.	Japan	U.S.	Japan
Private Business Economy	0.5	2.4	0.4	0.6
Goods	0.6	3.6	0.4	2.4
Agriculture	(1.5)	(5.0)	(0.4)	(3.7)
Mining	(2.8)	4.1	(1.1)	2.8
Construction	(2.6)	(1.4)	0.6	(4.0)
Manufacturing	1.7	5.1	1.3	4.1
Services	0.4	1.4	0.4	(0.6)
Transportation & Communication	2.7	3.0	1.2	(0.3)
Utilities	(0.8)	(0.9)	(1.4)	2.7
Trade	1.0	2.8	1.8	(1.2)
Finance & Insurance	(0.4)	4.3	(1.7)	5.8
Real Estate	1.6	(1.7)	(2.0)	(3.4)
Business & Professional	(1.0)	(2.6)	1.3	(6.0)

Source: American Productivity Center

States typically is growing at least nearly as fast and has a higher level of performance. The labor productivity level calculations for 1983, shown in **Figure 20**, must be read with caution. The purchasing-power-parity exchange basis for the whole economy, U.S. versus Japan, has been used for the segments of the economy also. On the average, this will be successful. But for

any given industry, it could cause a fairly substantial distortion. Once purchasing-power-parity rates are developed for sub-economies, this comparison will obviously be much more meaningful. But even taking these numbers as rough indicators, it can be seen that in some favorite industries such as electrical machinery, chemicals, primary metals, and, oddly, finance and

insurance, Japanese performance is order of magnitude half again more productive than that of the United States. Conversely, in industries not emphasized in Japan, such as food, textiles, fabricated metal, transport, and retail trade, the U.S. productivity level is approximately twice that of Japan.

19c. Labor Productivity Growth, Manufacturing

	1970-80		1980-83	
	U.S.	Japan	U.S.	Japan
Manufacturing	2.5	7.7	3.1	6.2
Food & Tobacco	3.2	5.3	1.6	0.1
Textile	3.7	7.4	6.0	2.9
Pulp & Paper	3.1	5.8	5.8	6.4
Chemicals	3.7	10.3	3.5	13.5
Primary Metals	0.9	9.5	1.4	(6.7)
Fabricated Metals	1.7	4.3	3.8	2.3
Non-Elec. Machinery	1.9	7.7	4.6	7.4
Elec. Machinery	4.6	17.0	3.0	15.2
Transportation Equipment	2.0	7.7	3.8	3.6
Other Manufacturing	2.1	3.2	2.3	2.6

Source: American Productivity Center

19d. Total Factor Productivity Growth, Manufacturing

	1970-80		1980-83	
	U.S.	Japan	U.S.	Japan
Manufacturing	1.7	5.1	1.3	4.1
Food & Tobacco	2.3	2.6	0.3	(2.8)
Textile	2.9	5.3	4.5	1.7
Pulp & Paper	1.9	2.0	4.3	5.3
Chemicals	2.5	6.7	1.7	9.9
Primary Metals	0.2	4.8	(2.9)	(9.1)
Fabricated Metal	0.9	3.1	1.8	1.1
Non-Elec. Machinery	1.2	6.3	1.0	5.6
Electrical Machinery	3.7	14.3	1.1	12.2
Transportation Equipment	1.0	5.2	1.8	0.7
Other Manufacturing	1.1	1.3	0.9	0.7

Source: American Productivity Center

Figure 20
Labor Productivity Levels in Japan, 1983
(U.S. = 100 for Each Industry, Purchasing Power Parity Basis)

Private Business Economy	68
Goods	69
Agriculture	36
Mining	69
Construction	53
Manufacturing	88
Food & Tobacco	53
Textile	41
Pulp & Paper	81
Chemicals	156
Primary Metal	132
Fabricated Metal	48
Non-Elec. Machinery	89
Electrical Machinery	173
Transportation Equipment	105
Other Manufacturing	65
Services	64
Transportation & Communications	41
Utilities	87
Trade	55
Finance & Insurance	178
Real Estate	N/A
Business & Professional	50

Source: American Productivity Center

Figure 21
International Manufacturing Labor Productivity

	1973-85 (average annual percentage growth)	1982-85
Japan	5.6	5.8
France	4.5	4.3
West Germany	3.8	6.1
Italy	3.6	4.2
Sweden	3.0	5.1
United Kingdom	2.8	4.8
Norway	2.3	3.6
United States	2.2	4.8
Canada	1.9	4.4

Source: Bureau of Labor Statistics

Probably the most meaningful comparison of performance between countries is in the manufacturing area, which is relatively easy to measure. **Figure 21** shows international manufacturing productivity growth rates in major countries. The Japanese performance is best both in the twelve-year period and in the more recent three-year period. The United States is near the bottom in the longer term comparison, but due to the 1983-84 recovery in the United States, the United States' growth rate in manufacturing is quite respectable compared to the other countries of the world.

This table demonstrates the paradox mentioned earlier. Although the United States' manufacturing improvement trend stands out when compared to its service industry improvement trend, the brief warm feeling thus engendered melts away when you compare the long-term U.S. manufacturing rate with that of its main competitors. The good news is that United States manufacturing is growing substantially faster than the U.S. service industry. The bad news is that the U.S. manufacturing rate is not growing acceptably compared to other manufacturing countries in the world.

Since much attention has been focused on the relative performance of the Pacific Basin, **Figure 22** reports recent statistics from the Asian Productivity Organization on the main Asian countries. Relative level of labor productivity is shown both for the nation and for the manufacturing sector in 1983, and a labor productivity growth rate is shown for 1975 to 1983. In this case all are compared against the levels of Japan rather than the United States. The good performance of the four other main

countries in Asia (Singapore, Hong Kong, Taiwan, and Korea) is shown clearly here, although each country has its relative strengths. Both Singapore and Hong Kong show up better on the national level than they do on manufacturing level, which, if these statistics are accurate, suggests that much of their success is as traders and not necessarily as manufacturers. This table also clearly recommends Fiji as a subject for further research, for which volunteers will probably not be lacking.

Figure 22
Labor Productivity in Asia

	1983, Relative Level of Labor Productivity		Labor Productivity 1975-83, Growth/Year
	Nation	Manufacturing	Nation
Japan	100	100	3.3
Fiji	86*	54*	2.0*
Singapore	76	38	4.0
Hong Kong	70**	30***	9.4**
Taiwan	36	28	5.1
Korea	23*	20	4.9
Malaysia	21*	16**	4.3*
Philippines	11	18	1.8
Thailand	8*	13*	2.2*
Pakistan	6*	6*	2.3*
Sri Lanka	4***	3***	3.9***
Bangladesh	4	2	1.2**
India	N/A	N/A	1.7

*82 Data

**81 Data

***80 Data

Source: Asian Productivity Organization

The only way of getting at the productivity level of most of the countries of the world where statistics are not a main product is simply to use gross national product per capita. This is presented more as a social indicator than as an economic indicator, because in many countries a high proportion of the population is effectively not in the economic mainstream. **Figure 23** presents the top 50 countries (each with

more than a million in population) and classifies them by geographical area and by level of gross national product per capita. The world leaders are three small countries. The United States is still the leader among the larger countries. In the next category are many of the European countries, including West Germany and France, along with Australia, Japan, and Saudi Arabia. It must be remem-

bered that 1984 was a period of very high dollar exchange rates, and it is likely that more current statistics would tighten the differences shown here. It is thought provoking that there are 58 countries (each with populations of more than a million) that did not make this list where the gross national product per capita is at best only 7 percent of that of the United States.

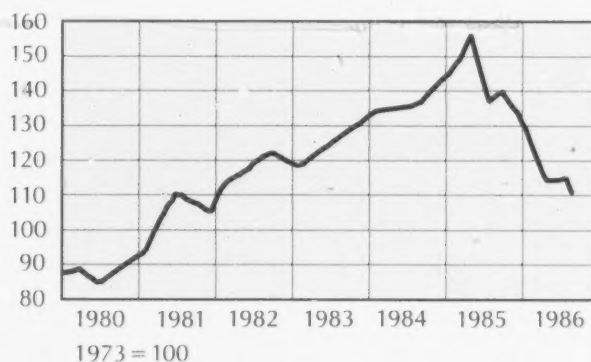
Figure 23
Level of GNP per Capita for the Top 50 Reporting Countries, 1984

\$000/Capita	Western Hemisphere	Europe	Pacific Basin	Africa & Near East
15.5 +		Switzerland		United Arab Emirates Kuwait
15.4	United States			
9.5-15.3	Canada	Norway Sweden Denmark West Germany Finland France Netherlands	Australia Japan	Saudi Arabia
6.3-9.5	Trinidad	Austria Belgium United Kingdom Italy	New Zealand Singapore Hong Kong	Libya Oman
2.2-6.2	Venezuela Argentina	Ireland Spain Greece		Israel Algeria South Africa
1.2-2.1	Mexico Uruguay Panama Brazil Chile Colombia Paraguay Costa Rica	Yugoslavia Hungary Poland Portugal	Korea Malaysia	Syria Jordan Tunisia

Source: World Bank

Perhaps the single most interesting chart is **Figure 24**, which shows the movement of exchange rates. Just as the 1980-85 period showed an unprecedentedly strong increase in the dollar, so the last year and a half has shown a remarkable drop in the value of the dollar—about 30 percent in this trade-weighted exchange rate calculated by the U.S. Department of Commerce. But that fall in the dollar had a radically different impact on each country, depending on the country's own approach to monetary policy. In **Figure 25**, in which the yen per dollar rate is shown, the shift in Japanese policy is clear. The yen accompanied the dollar quite closely in 1980-85, but in the last year and a half, the yen has fallen 40 percent. This should force the U.S.'s Japanese trade imbalance to shrink substantially. The expected effects have not appeared as of this writing, but it is reasonable to think that, over the longer term, the trade imbalances will at least not worsen.

Figure 24
U.S. Dollar Trade-Weighted Exchange Rate



Source: U.S. Department of Commerce

Figure 25
U.S.-Japanese Currency Exchange Rate



Source: Federal Reserve

Figure 26 shows the current monetary situation. One year ago the United States' real long-term interest rates were 2 to 3 percent above rates of European countries and even more above those of Japan. This imbalance has at least partly been corrected. This figure shows real long-term rates in Germany and the United Kingdom higher than

in the United States, and in other countries somewhat lower, but all of them approximately within a point of the United States level. This uses last 12 months' inflation rather than the uncalculable "expectation" about future inflation, which perhaps leads to some distortion. But the very high position of U.S. interest rates has been eroded. Neverthe-

less, as the U.S. government and business economy both still have insatiable capital requirements, and as the United States, for whatever reason, still appears to be an attractive place to put money, the flows will continue and the exchange rates will continue to be higher than they would otherwise be.

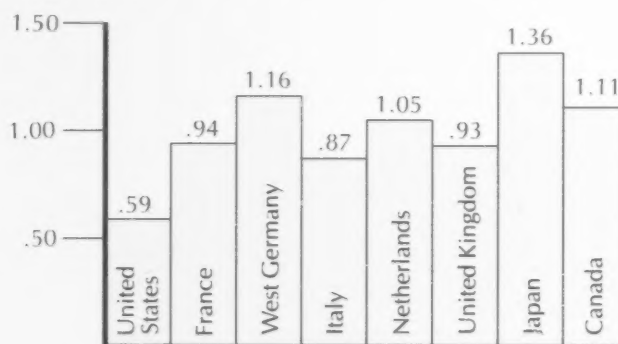
Figure 26
Money Markets, September 1986

	Nominal Interest Rates			Real Interest Rates	
	3-Month Money Market	Long Term Government Bonds	Last 12 Months Inflation	Short Term	Long Term
United States	5.5	7.8	1.8	3.7	6.0
Canada	8.5	9.5	4.1	4.4	5.4
France	7.4	8.2	2.3	5.1	5.9
Italy	11.5	10.4	5.9	5.6	4.5
West Germany	4.6	6.4	(0.9)	5.5	7.3
United Kingdom	11.1	10.8	3.0	8.1	7.8
Japan	4.8	4.8	0.1	4.7	4.7

Source: The Economist

The world's headlines are now filled with statements about trade and its potential political implications. The United States' trade deficit hit an all-time high in 1985. **Figure 27** shows that the United States export/import ratio has fallen to .59, whereas the other major trading countries in the world are generally within 15 percent of balance. The U.S. gap between imports and exports as measured by that export/import ratio has gone from the low eighties five years ago to .59

Figure 27
International Trade Balances, 1985
Export/Import Ratio



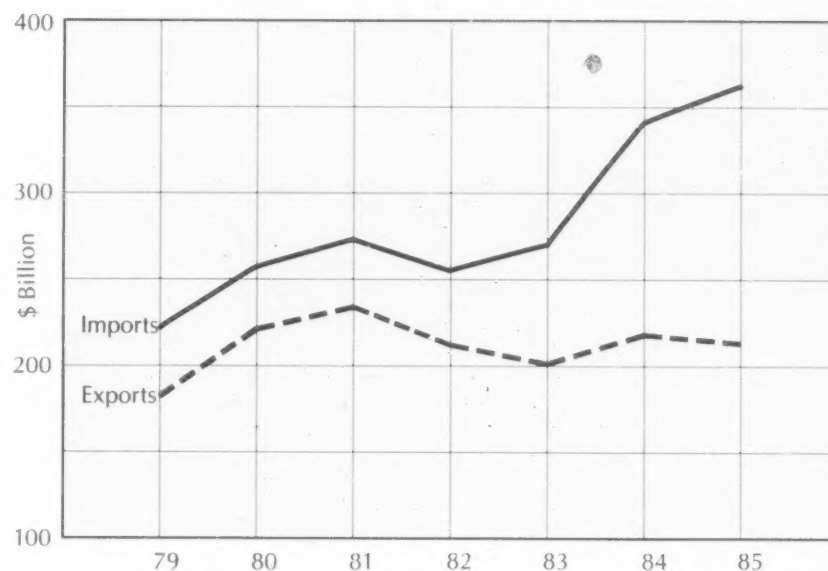
\$ Billions		
Exports (FOB)		Imports (CIF)
213	United States	362
102	France	108
184	West Germany	158
79	Italy	91
68	Netherlands	65
101	United Kingdom	109
177	Japan	130
91	Canada	81

Source: International Monetary Fund

now, as shown in **Figure 28**.

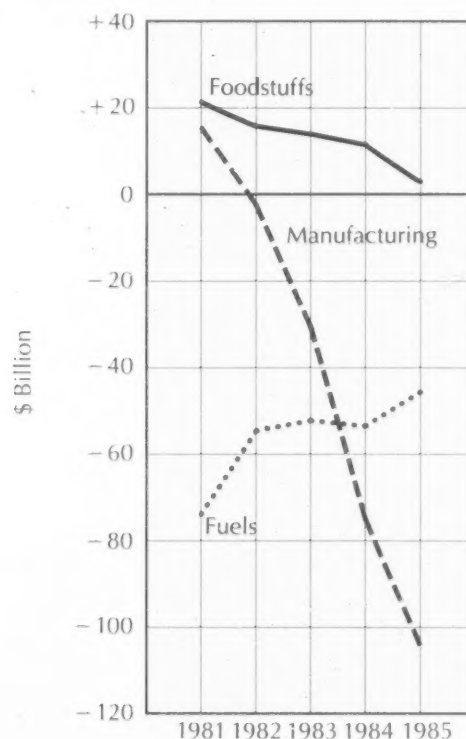
Figure 29 shows the shift in the nature of the U.S. trade deficit. There was a period when negative pressures came from the fuel import imbalance and a great contribution to balance was made by large exports of foodstuffs. Both of these have changed; the fuel imbalance is getting smaller every year and the foodstuff surplus has shrunk almost to nothing. Meanwhile the manufacturing balance, fueled by the high value of the dollar, has fallen precipitously. The manufacturing trade imbalance is such that virtually nothing foreseeable in either foodstuffs or fuels will unilaterally solve the problem; it is clear that manufacturing export business must be stimulated in some way.

Figure 28
Deterioration of U.S. Trade Balance



Source: International Monetary Fund

Figure 29
Shift in Nature of U.S. Trade Deficit



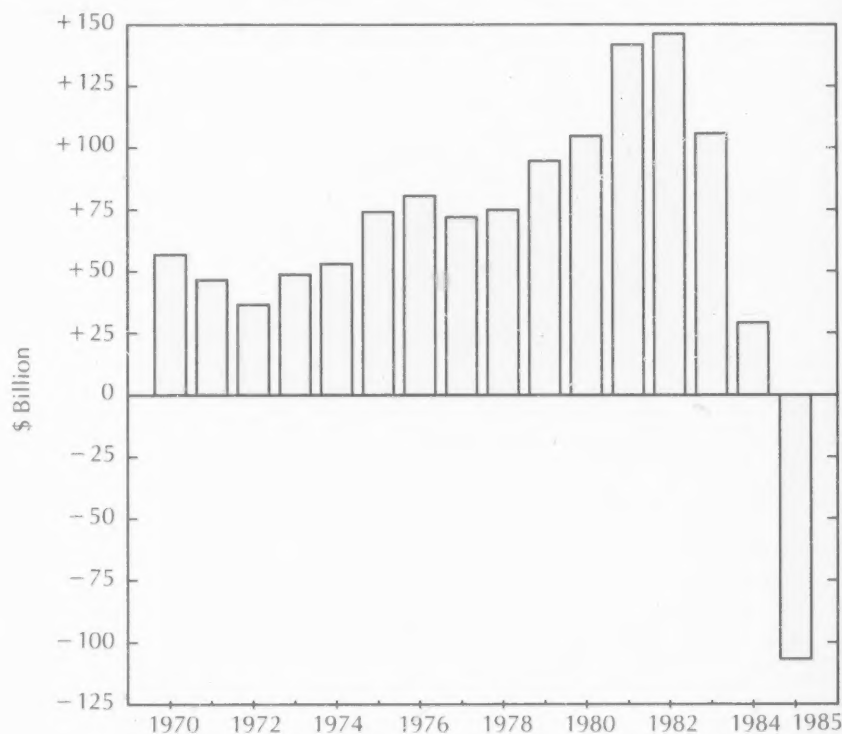
Source: Central Intelligence Agency

Figure 30 shows the position of net U.S. foreign investment. In 1985, the U.S. became a "debtor nation" for the first time since 1914: the U.S. now owes more to foreign nations than foreign nations owe the U.S. This is an abrupt change from as recently as 1982, when other nations owed the U.S. a net \$150 billion.

The U.S. is just not now comfortable as an exporting nation. The United States has not recently been as dependent on exports as many other countries of the world have in their history. The United States has often had a product dominance that made exporting an "easy sell." The easy sells are now gone, and the U.S. does not have an effective international trading infrastructure in either the private sector or in the government support area.

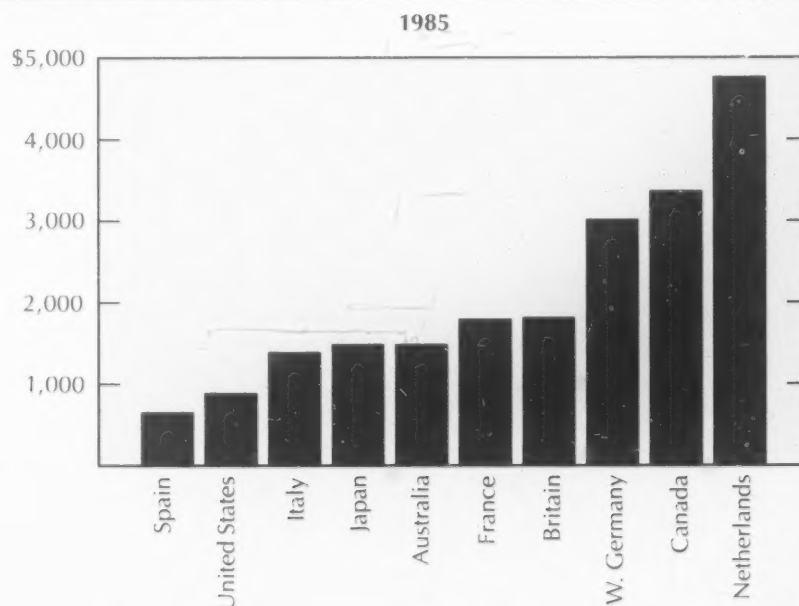
Figure 31 shows exports per capita of several leading nations. It is clear that Holland and, to a lesser extent, Canada and West Germany are very dependent on exports. It is a little surprising how far down Japan is in this index. Although Japan is a major exporter, there is still a great section of the Japanese economy that is not involved with exports. But still, Japanese exports per capita are approximately twice those of the United States.

Figure 30
Net U.S. Foreign Investment, 1970-85



Source: Departments of Commerce, Treasury

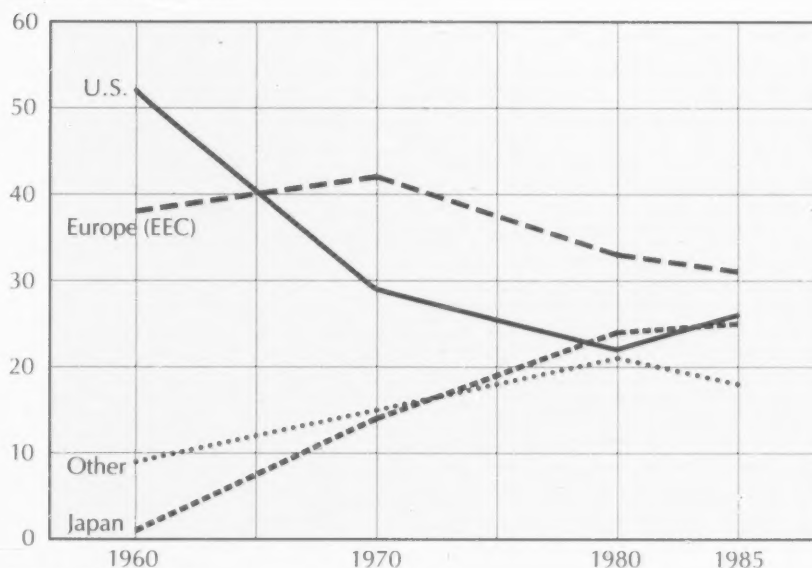
Figure 31
Exports per Capita



Source: Organization for Economic Cooperation and Development

The most dramatic story in the trends of exporting and importing is passenger car production. **Figure 32** demonstrates the surge of Japan since 1960 and the changing pattern of from whom Japan is taking away business. Between 1960 and 1970 Japan took business away from the United States exclusively. From 1970 to 1980 Japan and other countries took business away from both the U.S. and Europe. In the last five years, Europe has been the main loser, with the United States regaining some ground and regaining a slight lead over Japan in passenger car production, although achieving that lead in part through the cooperation of Japanese car companies now manufacturing in the United States.

Figure 32
World Passenger Car Production
Percent of World Total



Source: The Economist

Looking beyond trade balances to the basic economic condition of the other countries of the world, we can see in **Figure 33** that we are not alone with our difficulties. The United States' real GNP growth in the

last decade is among the leaders of the world, and even in the last 12 months performance is not too bad. Average inflation over the last ten years has been in the middle of the pack. Germany, Switzerland, and Japan have had

less inflation; many of the other countries of the world have had a bit more. The U.S. inflation reduction performance over the last few years has captured U.S. headlines. But Germany and the Netherlands have actually

Figure 33
World Economic Factors

	Real GNP Growth		Consumer Price Inflation		Unemployment
	Average 1975-85	Last 12 Months*	Average 1975-85	Last 12 Months*	
Australia	2.9	0.7	9.0	8.4	8.4
Belgium	1.6	N/A	6.4	0.8	12.9
Canada	2.7	3.9	8.1	4.1	9.5
France	2.3	2.6	10.1	2.3	10.8
Italy	2.4	2.2	15.1	5.9	13.4
Japan	4.5	3.6	4.6	0.1	2.9
Netherlands	1.6	(2.1)	4.7	(0.6)	4.4
Spain	1.9	N/A	15.1	9.5	20.6
Sweden	1.5	0.9	9.7	4.4	3.2
Switzerland	1.5	1.7	3.5	0.6	0.7
United Kingdom	1.7	1.4	10.8	3.0	11.6
United States	2.8	2.2	7.2	1.8	7.0
West Germany	2.3	3.3	3.9	(0.9)	8.8

*Last 12 months for GNP is usually June 85-June 86

Last 12 months for inflation is usually September 85-September 86

Latest for unemployment is usually September 86

Source: The Economist, Central Intelligence Agency, Organization for Economic Cooperation and Development

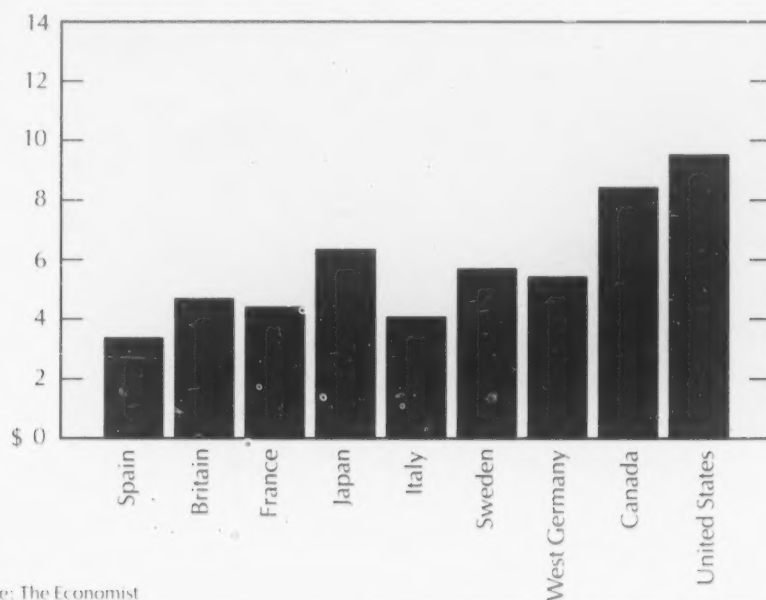
deflated in the last 12 months, and Japan has remained essentially flat in consumer prices. The U.S. unemployment rate is also in the middle of the pack. Japan, Sweden, and Switzerland are lower; most of the other European countries are quite a bit higher. The U.S. retains a substantial

labor cost disadvantage. **Figure 34** shows the dollar wage per hour of the United States versus other countries in the world. Our wage per hour is still 20 to 40 percent higher than in most of Europe and Japan (**34a**). The U.S. basic wage rate is about \$3.00 per hour higher than Japan's. But **34b** shows that the

total employment cost is \$4.50 per hour higher because Japan has extremely low non-wage costs compared to anyone in the world. But the United States' non-wage costs, which amount to 37 percent of wages, are compared to European countries where that percentage is between 70 and 90 percent.

Figure 34
Labor Costs

34a. Industrial Wage Costs per Hour, 1985



Source: The Economist

The United States and Japan share one interesting statistic that can be viewed either as a problem or as an opportunity. Both countries have approximately 60 percent of their working age population employed (**Figure 35**). Of the major countries, only Sweden, with 65 percent, has a higher percentage. Some of the European countries are below 50 percent. On one

hand that means those countries could get quite a bit more work out of their existing social structure if they could find the mechanism for doing so. On the other hand, as social changes bring a demand for work from the non-working part of the workforce, social difficulties may arise if there are no jobs available.

34b. Non-Wage Costs as Percent of Wages

Italy	98
W. Germany	82
France	81
Sweden	72
Spain	60
Britain	42
United States	37
Canada	36
Japan	28

Source: The Economist

Figure 35
1985 Employment/
Working-Age Population

Sweden	65.3%
Japan	60.6
United States	60.1
Canada	58.4
Australia	56.6
United Kingdom	55.3
France	50.6
West Germany	49.2
Italy	44.4
Netherlands	44.0

Source: Bureau of Labor Statistics

Figure 36 shows that Japan is still the world leader in hours worked per person per year. Japan in 1984 averaged 2,149 hours, which, incredibly, is an increase in average work year compared to 1975. All the other countries shown have a decline in hours worked, the most notable being France and the United Kingdom with 10 and 8 percent declines in that nine-year period. This puts France and the United Kingdom about 5 percent below the United States in hours worked per person, but the United States in turn is 24 percent below Japan.

Another potential social problem of major magnitude is shown in **Figure 37**. The aging of the population in Japan and West Germany is much more notable than will be the case in the United States and some other countries. Pensioners as a percentage of labor force in Japan will grow from a current 18 percent to 40 percent by the year 2010, whereas the United States'

Figure 36
Hours Worked per Person per Year

	1984	Comparative 1984 Level	1975	% Change 1975-84
Japan	2,149	100	2,105	+ 2.0
West Germany	1,676	78	1,736	- 3.5
Netherlands	1,640	76	1,695	- 3.2
United States	1,632	76	1,673	- 2.5
France	1,554	72	1,726	-10.0
United Kingdom	1,518	71	1,650	- 8.0

Source: Angus Maddison

comparable numbers show a very slight growth, from only 24 to 26 percent. If you speculate about how the pensioners' needs will be met beyond private pensions, an increase in public debt will most likely be required to meet this responsibility. The large increases in the public debt that will be required in Japan, Italy, Germany, and the United Kingdom are estimated in **Figure**

37. Although the United States' figure would be expected to double, the U.S. would still have public debt at a much lower level than anyone except France. This may be a competitive advantage for the United States, but more appropriately should be viewed as a social problem for the whole world.

Figure 37
Pensioners

	Pensioners As Percent of Labor Force		Net Public Debt As Percent of GNP (Reflecting Demographics)	
	Actual 1985	Estimated 2010	Approximate 1985	Estimated 2010
France	31	40	20	35
United Kingdom	30	28	50	135
West Germany	29	41	25	90
Italy	27	34	100	230
United States	24	26	30	60
Japan	18	40	25	105

Source: The Economist

Figure 38
Degree of Wage Variation
Between Industries within
Country, 1982*

	Percent
Japan	27
United States	26
United Kingdom	17
West Germany	15
France	13
Italy	10

*Standard Deviation
Mean

Source: Organization for Economic
Cooperation and Development
(in The Economist)

Another interesting situation where the United States and Japan have a relative advantage is in the degree of variation in wage from industry to industry within their respective countries. As is shown in Figure 38, in the U.S. and Japan there is a relatively wide latitude: workers in one industry are paid very different wages from workers in another industry. This flexibility allows relatively rapid increases or decreases in different industries and is essential to being a competitive country. The other major competitors of the world have substantially less variation, whether caused by legislation or simply by traditional practice. In Italy, there is an incredibly small degree of wage variation between industries.

Figure 39
International Savings and Investment

	1985 Savings as Percent of Disposable Personal Income	1984 Gross Domestic Savings as Percent of GDP
United States	4.6	16
France	12.4	19
West Germany	12.9	23
Italy	21.9*	18
Netherlands	N/A	23
United Kingdom	11.7	17
Japan	17.2	31
Canada	12.1	22

*1984 data

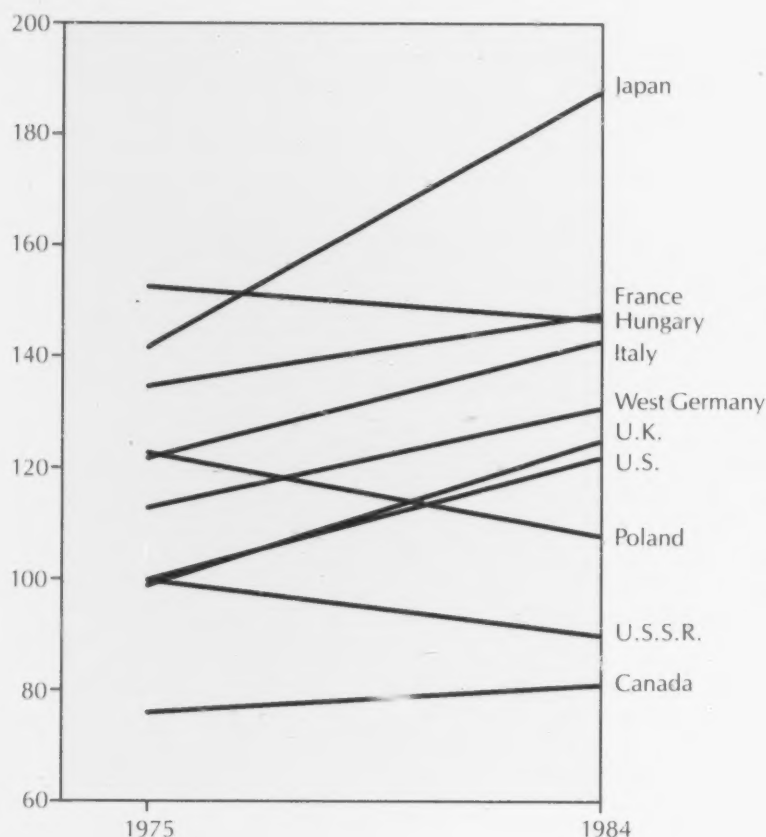
Sources: World Bank, Central Intelligence Agency

International savings and investment statistics continue to show the United States' traditionally weak position in this area (Figure 39). In 1985, savings as a percent of disposable personal income in the United States declined further to 4.6 percent, whereas in all other major countries of the world the figure was in double digits. In Japan it was at 17.2 percent. In gross domestic savings as a percent of GDP, the United States has some competition for its low position. France, Italy, and the United Kingdom all have similar problems. The United States' 16 percent compares to an astounding 31 percent for Japan, and it is this ability to generate savings that has continued to be the engine of economic expansion for Japan.

Much has been made of labor and capital productivity for nations. It should also be pointed out that energy productivity can be calculated, analyzed, and improved. **Figure 40** demonstrates that those who least needed to improve their energy productivity had the most progress in improving, and that those who most needed to improve didn't. The United States' improvement in energy productivity from 1975 to 1984 is approximately the same amount as was shown in most European countries. All of them fell way behind the substantial improvement in energy productivity shown in Japan. The countries behind the Iron Curtain—U.S.S.R., Hungary, and Poland—seemed oblivious to the higher costs of energy and all declined substantially in energy productivity during this period. The level of this statistic is partly out of the country's control because countries that are of substantial geographic size and are underpopulated (such as Canada and U.S.S.R.) are naturally going to incur more energy use than are small, highly populated countries such as Japan or the United Kingdom. But energy productivity improvement can be a national goal, and this demonstrates that many countries did a good job in that area.

In summary, the United States' position as the world's most productive nation remains in jeopardy. The flattening out that we have seen since the recent recovery, particularly in the non-manufacturing sector, makes the United States all the more vul-

Figure 40
Energy Productivity
(Real GNP/Oil Equivalent Barrel)
U.S. 1975 = 100



Source: Central Intelligence Agency

nerable to splendid competitive performance from other parts of the world. Although some of the European countries, and even Japan, are showing signs of faltering in some areas, there are plenty of other smaller, more aggressive countries ready to

take up the slack. The United States' chief competitors seem to continue to achieve better productivity gains in spite of the fact that many of their economic indicators show bigger problems.

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